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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

RCA 89608

DESIGNATED/ELECTED OFFICE (DO/EO/US)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

CONCERNING A FILING UNDER 35 U.S.C. 371

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INTERNATIONAL APPLICATION NO.
PCT/US00/18893INTERNATIONAL FILING DATE
12 July 2000 (12.07.00)PRIORITY DATE CLAIMED
15 July 1999 (15.07.99)

TITLE OF INVENTION

METHOD AND APPARATUS FOR SUPPORTING TWO DIFFERENT TYPES OF INTEGRATED CIRCUIT
CARDS WITH A SINGLE CONNECTOR

APPLICANT(S) FOR DO/EO/US

Charles William Worrell and Yefim Vayl

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

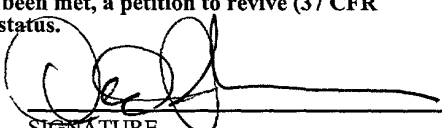
Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

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DATE DEPOSITED: January 11, 2002

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.01030788)		INTERNATIONAL APPLICATION NO. PCT/US00/18893		ATTORNEY'S DOCKET NUMBER RCA 89608																																																			
24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT = Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)). <table border="1"><thead><tr><th>CLAIMS</th><th>NUMBER FILED</th><th>NUMBER EXTRA</th><th>RATE</th></tr></thead><tbody><tr><td>Total claims</td><td>13 - 20 =</td><td>0</td><td>x \$18.00</td></tr><tr><td>Independent claims</td><td>2 - 3 =</td><td>0</td><td>x \$84.00</td></tr><tr><td colspan="3">Multiple Dependent Claims (check if applicable).</td><td><input type="checkbox"/></td></tr><tr><td colspan="3">TOTAL OF ABOVE CALCULATIONS</td><td>=</td></tr><tr><td colspan="3"><input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.</td><td></td></tr><tr><td colspan="3">SUBTOTAL</td><td>=</td></tr><tr><td colspan="3">Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).</td><td>+</td></tr><tr><td colspan="3">TOTAL NATIONAL FEE</td><td>=</td></tr><tr><td colspan="3">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).</td><td><input type="checkbox"/></td></tr><tr><td colspan="3">TOTAL FEES ENCLOSED</td><td>=</td></tr><tr><td colspan="3"></td><td>Amount to be: refunded \$</td></tr><tr><td colspan="3"></td><td>charged \$</td></tr></tbody></table> <p>a. <input type="checkbox"/> A check in the amount of _____ to cover the above fees is enclosed.</p> <p>b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>07-0832</u> in the amount of <u>\$890.00</u> to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>07-0832</u> A duplicate copy of this sheet is enclosed.</p> <p>d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p> <p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <div><p>Mr. Joseph S. Tripoli THOMSON multimedia Licensing Inc. Patent Department PO Box 5312 Princeton, New Jersey 08540</p></div> <div><p> SIGNATURE DAVID T. SHONEMAN NAME 39,371 REGISTRATION NUMBER January 11, 2002 DATE</p></div>				CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	13 - 20 =	0	x \$18.00	Independent claims	2 - 3 =	0	x \$84.00	Multiple Dependent Claims (check if applicable).			<input type="checkbox"/>	TOTAL OF ABOVE CALCULATIONS			=	<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				SUBTOTAL			=	Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).			+	TOTAL NATIONAL FEE			=	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).			<input type="checkbox"/>	TOTAL FEES ENCLOSED			=				Amount to be: refunded \$				charged \$
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Charles William Worrell and Yefim Vayl
Filed : Herewith
For : METHOD AND APPARATUS FOR SUPPORTING TWO
DIFFERENT TYPES OF INTEGRATED CIRCUIT CARDS
WITH A SINGLE CONNECTOR

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Sir:

In the US national phase application of PCT/US00/18893 filed
herewith, please enter the following amendments:

IN THE SPECIFICATION:

Please amend the specification as follows:

On Page 1, line 3, please insert the following paragraph:

--This application claims the benefit under 35 U.S.C. § 365 of
International Application PCT/US00//18893, filed July 12, 2000, which was
published in accordance with PCT Article 21(2) on January 25, 2001 in English; and
which claims benefit of U.S. provisional application serial no. 60/143,843 filed July
15, 1999.--

IN THE CLAIMS:

Please amend the claims (which are the annexes to the International
Preliminary Examination Report) as follows. A marked-up version is attached
herewith.

1. (AMENDED) A computer controlled device operable using an integrated circuit
(IC) card of a first type or of a second type, the device comprising:

a card reader, coupled to a microcontroller, wherein the card reader receives
the IC card, said card reader having

means for applying a first signal to at least one of the operational contacts of the IC card that is placed in said card reader;

wherein the IC card of the first type responds differently to the first signal than the IC card of the second type, at least one of the IC cards producing a distinct second signal in response to the first signal;

means for determining whether the IC card in the card reader has produced the second signal; and

wherein means are provided for one of blocking and enabling signals over at least one of said operational contacts, in response to said determining means.

2. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an ISO/7816 card.

3. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an NRSS card.

4. (AMENDED) The computer controlled device of claim 1 wherein said card reader applies the first signal to an input/output contact of the IC card and monitors whether the IC card produces the second signal at the input/output contact of the IC card.

5. (AMENDED) The computer controlled device of claim 1 wherein at least one of the means for producing, the means for determining and the means for blocking is contained in an interface controller, and wherein said operational contacts comprise a connector coupled to said interface controller, for providing a conductive path between said interface controller and the IC card.

6. (AMENDED) The computer controlled device of claim 1 wherein said means for one of blocking and enabling comprises:

a buffer, coupled between said interface controller and said connector, for blocking and enabling a signal to pass along a conductive path including a contact of the IC card, the buffer being responsive to a signal from said interface controller; and

a resistor, coupled to said connector, for coupling the contact of the IC card to a supply voltage.

7. (AMENDED) A method of providing an interface for an integrated circuit (IC) card of a first type or of a second type, the IC card having operational contacts and responding differently to signals applied to their respective operational contacts, the method comprising the steps of:

providing one reader having operational contacts for receiving the IC card;

accepting an integrated circuit (IC) card into the reader;

determining whether the integrated circuit (IC) card in the reader is a card of the first type or a card of the second type by subjecting the card in the reader to a signal and determining whether a responsive signal from the card is characteristic of a card of the first type or a card of the second type; and

implementing an interface for the identified IC card, wherein at least one signal path to predetermined ones of the operational contacts is enabled, or at least one signal path is disabled, as a result of whether the responsive signal was determined to be characteristic of the first type or the second type.

8. (AMENDED) The method of claim 7 wherein the signal is selected such that a card of one of said first and second types transmits a reply signal in response to the signal and a card of the other of said first and second types is non-responsive to the signal.

9. The method of claim 7 wherein the signal is a reset signal.

10. (AMENDED) The method of claim 7 wherein said implementing step comprises the step of disabling selected contacts of the IC card if said determining step identifies the IC card as a card of one of said two types.

11. (AMENDED) The method of claim 7 wherein said implementing step comprises the step of enabling selected contacts of the IC card if said determining step identifies the IC card as a card of one of said two types.

12. The method of claim 7 wherein one of said types is ISO/7816.

13. The method of claim 7 wherein one of said types is NRSS.

IN THE ABSTRACT:

Please add the following Abstract.

-- A method and apparatus for implementing an interface for ISO/7816 and NRSS cards with a single connector. The apparatus is a computer controlled device comprising a card reader further comprising an interface controller and a connector. The connector forms the interface between the card reader and the IC card. The interface controller determines whether the IC card inserted into the card reader is an ISO/7816 or NRSS card. Additionally, the interface controller implements the correct interface for the detected IC card. The method comprises the steps of determining whether a IC card is an ISO/7816 or NRSS card and implementing an interface for the identified IC card.--

REMARKS

The specification has been amended to include a reference to the priority applications.

Claims 1, 4-8 and 10-11 have been amended to remove reference indicia and to meet the requirement of the United States.

To meet the requirements of the United States, the Abstract (as originally filed in the PCT application) is added.

No fee is believed to have been incurred by virtue of this amendment.
However if a fee is incurred on the basis of this amendment, please charge such fee
against deposit account 07-0832

Respectfully submitted,
Charles William Worrell
Yefim Vayl



David T. Shoreman
Attorney for Applicant
Registration No. 39,371
609/734-9875

THOMSON multimedia Licensing Inc.
Patent Operation
PO Box 5312
Princeton, NJ 08543-5312

January 11, 2002

MARKED UP VERSION OF THE AMENDED CLAIMS

1. (AMENDED) A computer controlled device [(104)] operable using an integrated circuit (IC) card of a first type or of a second type, the device comprising:
a card reader [(116)], coupled to a microcontroller [(112)], wherein the card reader [(116)] receives the IC card, said card reader having
means [(122)] for applying a first signal to at least one of the operational contacts of the IC card [(102)] that is placed in said card reader [(116)];
wherein the IC card of the first type responds differently to the first signal than the IC card of the second type, at least one of the IC cards producing a distinct second signal in response to the first signal;
means [(122, 112)] for determining whether the IC card in the card reader [(116)] has produced the second signal; and
[characterized in that] wherein means [(124)] are provided for one of blocking and enabling signals over at least one of said operational contacts, in response to said determining means.
2. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an ISO/7816 card.
3. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an NRSS card.
4. (AMENDED) The computer controlled device of claim 1 wherein said card reader [(116)] applies the first signal to an input/output contact [(C7)] of the IC card [(102)] and monitors whether the IC card produces the second signal at the input/output contact [(C7)] of the IC card.
5. (AMENDED) The computer controlled device of claim 1 wherein at least one of the means for producing, the means for determining and the means for blocking is contained in an interface controller [(122)], and wherein said operational contacts comprise a connector [(120)] coupled to said interface controller [(122)], for providing a conductive path between said interface controller and the IC card [(102)].

6. (AMENDED) The computer controlled device of claim 1 wherein said means for one of blocking and enabling comprises:

a buffer [(124)], coupled between said interface controller [(122)] and said connector [(120)], for blocking and enabling a signal to pass along a conductive path including a contact of the IC card, the buffer [(124)] being responsive to a signal from said interface controller [(122)]; and

a resistor [(126)], coupled to said connector [(120)], for coupling the contact of the IC card to a supply voltage [(Vcc)].

7. (AMENDED) A method of providing an interface for an integrated circuit (IC) card [(102)] of a first type or of a second type, the IC card having operational contacts and responding differently to signals applied to their respective operational contacts, the method comprising the steps of:

providing one reader [(116)] having operational contacts for receiving the IC card;

accepting an integrated circuit (IC) card [(102)] into the reader;

determining whether the integrated circuit (IC) card [(102)] in the reader [(116)] is a card of the first type or a card of the second type by subjecting the card [(102)] in the reader [(116)] to a signal and determining whether a responsive signal from the card is characteristic of a card of the first type or a card of the second type; and

implementing an interface for the identified IC card, [characterized in that] wherein at least one signal path to predetermined ones of the operational contacts is enabled, or at least one signal path is disabled [(122, 124, 126)], as a result of whether the responsive signal was determined to be characteristic of the first type or the second type.

8. (AMENDED) The method of claim 7 wherein the signal is selected such that a card [(102)] of one of said first and second types transmits a reply signal in response to the signal and a card [(102)] of the other of said first and second types is non-responsive to the signal.

9. The method of claim 7 wherein the signal is a reset signal.

- [illegible]

**METHOD AND APPARATUS FOR SUPPORTING TWO DIFFERENT TYPES OF
INTEGRATED CIRCUIT CARDS WITH A SINGLE CONNECTOR**

BACKGROUND OF THE DISCLOSURE

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1. Field of the Invention

The present invention relates to interfaces in a system using integrated circuit (IC) cards. More particularly, the invention relates to a method and apparatus for supporting two different IC card standards using a single IC card connector.

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2. Description of the Background Art

Integrated circuit (IC) cards, such as smart cards, are used in a variety of consumer electronics devices, including pay TV systems, set top cable television boxes, terrestrial television receivers, satellite television receivers and the like. Two types of IC card are based upon the ISO/7816 standard for conventional IC cards and the NRSS standard for IC cards having high-speed data transfer ports. The current IC card systems comprise a connector that is capable of supporting (or operating as an interface to) only one type of IC card. For example, a connector capable of supporting an ISO/7816 card cannot support a NRSS card, and vice versa. In order to support both types of IC cards, the IC card system would require an additional IC card connector. Therefore, a need exists for an IC card interface capable of supporting ISO/7816 and NRSS cards with a single connector.

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SUMMARY OF THE INVENTION

The invention overcomes the disadvantages associated with the prior art by providing a method and apparatus capable of receiving ISO/7816 and NRSS cards with a single connector. The apparatus is a computer-controlled device

comprising a card reader that further comprises an interface controller and a connector. The connector, which comprises eight pins, forms an interface between the computer controlled device and eight corresponding contacts of the IC card, i.e., contacts C1 through C8. The interface controller determines
5 whether the IC card inserted into the card reader is an ISO/7816 or NRSS card and provides the correct interface for the IC card.

Specifically, an interface controller sends a test signal to the input/output contact (C7) of the IC card and detects this contact (C7) to determine whether the IC card sends a reply or answer signal in response to the test signal. The
10 test signal is selected such that one type of IC card replies to the test signal, while the other type of IC card responds differently, e.g., is non-responsive, to the test signal. Once the interface controller determines the type of IC card, the interface controller implements the correct interface for the detected IC card.

For example, the interface may comprise buffers and pull-up resistors. Buffers block selected signals in the connectors (associated with contacts C4, C6 and C8) unless enabled by the interface controller. If the interface controller detects the IC card as a NRSS card, then the interface controller sends a "buffer enable" signal to the buffers. Pull-up resistors are coupled to connectors associated with selected contacts (C4, C6 and C8) on the IC card, in case the IC card is a NRSS card.
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The inventive method comprises the steps of determining whether an IC card is an ISO/7816 or NRSS card and implementing an interface for the identified IC card. The determining step further includes the steps of applying a test signal to the IC card and identifying whether the IC card transmits a reply
25 signal in response to the test signal. The implementing step may include blocking or enabling a buffer such that signals are transmitted to selected contacts of one type of IC card (i.e., a NRSS card) and blocked to selected contacts of the other type of IC card (i.e., an ISO/7816 card).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a block diagram of an integrated circuit (IC) card system including a IC card interface that operates in accordance with the present invention;

FIG. 2 depicts an assignment of signal contacts on a IC card; and

FIG. 3 depicts a flow diagram showing the operation of the present invention.

To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures.

DETAILED DESCRIPTION

FIG. 1 depicts an integrated circuit (IC) card system 100 comprising an IC card 102 and a computer controlled device 104. The IC card 102 is typically a smart card, an access card or a memory card for enabling the computer-controlled device 104 to operate a computer controlled system 106. The IC card 102 comprises a card controller 108 and a card memory 110. The card controller 108 coordinates signal and data transfer between the card memory 110 and the computer controlled device 104.

The IC card 102 includes an arrangement of contacts that generally comply with either the conventional ISO/7816 standard or the NRSS standard for high-speed data transfer. Variations of the ISO/7816 and NRSS cards are contemplated within the scope of the invention.

The computer-controlled device 104 generally includes any device that operates a computer-controlled system 106 upon receipt of the IC card 102. Examples of such computer-controlled devices 104 include a direct broadcast satellite television system, set top cable television boxes for cable and video-on-demand systems, high definition television system, terrestrial television receivers, satellite television receivers and other similar devices.

ARTICLE 34

The computer-controlled device 104 comprises a computer-controlled system 106, a microcontroller 112, a memory 114 and a card reader 116. The microcontroller is a processor that retrieves and executes a card reading software or routine 300 from the memory 114, instructs the card reader 116 to detect the IC card 102 received therein, and activates the computer controlled system 106 upon an acknowledgement from the card reader 116. The computer-controlled system 106 is a system or module that operates the IC card system 100 in response to a signal from the microcontroller 112. The memory 114 stores the card reading routine 300 or method, as well as other applications for implementing the IC card system 100.

10 The card reader 116 couples the IC card 102 to the computer-controlled device 104 at an interface 118. The card reader 116 comprises a connector 120 and an interface controller 122. The connector 120 comprises eight pins that form the interface 118 between the interface controller 122 and the IC card 102. If the pins are coupled to the contacts of the IC card 102, then these pins form conductive paths for transmitting or receiving signals and data through the interface 118. Additionally, the card reader 116 comprises a buffer 124 and a resistor 126 for further defining the interface 118.

20 The signals and data at the interface 118 are typically assigned to the contacts of the ISO/7816 and NRSS cards as depicted in FIG. 2. Five of the contacts have the same assigned signals for the two types of IC cards 102 depicted, namely: supply voltage, reset signal, clock signal, ground and data input/output. Another contact, typically the sixth contact (C6) of the IC card 102, is assigned to a programming signal for the ISO/7816 card and a NRSS clock signal for the NRSS card. The two remaining contacts, typically the fourth and eighth contacts (C4 and C8) on the IC card 102, are undefined for ISO/7816 cards, but represent high speed data input and output paths on NRSS cards.

25 The buffer 124 is coupled to the interface controller 122 and the pins of the connector associated with contacts C4, C6 and C8 of the IC card 102.

Specifically, the buffer 124 may block or disable the conductive path to and from the contacts C4, C6 and C8. If the buffer 124 receives a "buffer enable" signal from the interface controller 122, then the buffer 124 enables the conductive path between the interface controller 122 and contacts C4, C6 and C8 of the IC card 102.

The resistor 126 is coupled to a supply voltage, typically 5 volts, as well as to the pins of the connector associated with contacts C4, C6 and C8 of the IC card 102. If the buffer 124 blocks the conductive path to and from these contacts C4, C6 and C8, the pins associated with these connector are "pulled up" to the supply voltage. In this case, the supply voltage drives the contacts C4, C6 and C8. The pull up resistor 126 is generally of high resistance, such that the effect on the conductive path is minimal when the buffer 124 is enabled, i.e., a "weak" pull-up.

The interface controller 122 is a processor that determines whether the IC card 102 is an ISO/7816 or NRSS card. The interface controller 122 performs this determination while the microcontroller executes the routine or method 300. Once the correct IC card 102 is determined, the interface controller 122 implements the correct interface 118 for the ISO/7816 or NRSS card 102. The steps for determining the type of IC card 102 and implementing the correct interface for the IC card 102 are described with respect to FIG. 3.

FIG. 3 depicts a flow diagram of the routine or method 300 used in the present invention. Specifically, the microcontroller 112 executes the method 300 and the interface controller 122 implements the method 300 for determining whether the received IC card 102 is an ISO 7816 or NRSS card.

Once the IC card 102 is inserted into the card reader 116, the method 300 starts at step 302. At step 304, the method 300 assumes that the received IC card 102 is an ISO/7816 card. At this point, the buffers 124 are disabled for blocking the conductive path to and from contacts C4, C6 and C8

of the IC card 102. The pins associated with these contacts are pulled up to the supply voltage.

At step 306, the method 300 instructs the interface controller 122 to apply a test signal or a reset signal to contact C7 on the IC card 102. The test signal is selected such that the card controller 108 in one type of IC card 102 responds to the test signal, whereas the card controller 108 in the other type of IC card 102 responds differently, e.g., is non-responsive, to the test signal. For example, the test signal or reset signal may elicit a response from the ISO/7816 card and no response from the NRSS card.

At step 308, the interface controller 122 determines whether the received IC card 102 is a NRSS card. Specifically, the interface controller 122 determines whether the card controller 108 of the IC card 102 transmits a reply signal on contact C7. If the selected test or reset signal elicits a response from only an ISO/7816 card, the interface controller 122 checks for the absence of a reply signal from the IC card 102.

If the interface controller 122 identifies the IC card 102 as a NRSS card, the method 300 proceeds to step 310, where the interface controller 122 implements an interface 118 for the NRSS card. In this case, the interface controller 122 sends buffer enable signals to the buffers 124. Once the buffers 124 receive the buffer enable signal, the interface controller 122 may transmit NRSS input data and NRSS clock signals to contacts C4 and C6, and receive NRSS output data from contact C8 of the NRSS card.

If the interface controller 122 identifies the IC card 102 as an ISO/7816 card, the method 300 proceeds to step 312, where the interface controller 122 implements an interface 118 for the ISO/7816 card. In this case, there are no buffer enable signals and the buffers 124 continue to disable the conductive paths to and from contacts C4, C6 and C8 of the ISO/7816 card.

Although one embodiment, which incorporates the teachings of the present invention, has been shown and described in detail herein, those skilled in

the art can readily devise many other varied embodiments that still incorporate these teachings.

CLAIMS

1. A computer controlled device (104) operable using an integrated circuit (IC) card of a first type or of a second type, the device comprising:

5 a card reader (116), coupled to a microcontroller (112), wherein the card reader (116) receives the IC card, said card reader having

means (122) for applying a first signal to at least one of the operational contacts of the IC card (102) that is placed in said card reader (116);

10 wherein the IC card of the first type responds differently to the first signal than the IC card of the second type, at least one of the IC cards producing a distinct second signal in response to the first signal;

means (122, 112) for determining whether the IC card in the card reader (116) has produced the second signal; and

15 characterized in that means (124) are provided for one of blocking and enabling signals over at least one of said operational contacts, in response to said determining means.

2. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an ISO/7816 card.

20 3. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an NRSS card.

25 4. The computer controlled device of claim 1 wherein said card reader (116) applies the first signal to an input/output contact (C7) of the IC card (102) and monitors whether the IC card produces the second signal at the input/output contact (C7) of the IC card.

30 5. The computer controlled device of claim 1 wherein at least one of the means for producing, the means for determining and the means for blocking is contained in an interface controller (122), and wherein said operational contacts comprise a connector (120) coupled to said interface controller (122), for providing a conductive path between said interface controller and the IC card (102).

6. The computer controlled device of claim 1 wherein said means for one of blocking and enabling comprises:

35 a buffer (124), coupled between said interface controller (122) and said connector (120), for blocking and enabling a signal to pass along a conductive path including a contact of the IC card, the buffer (124) being responsive to a signal from said interface controller (122); and

a resistor (126), coupled to said connector (120), for coupling the contact of the IC card to a supply voltage (Vcc).

ARTICLE 34

7. A method of providing an interface for an integrated circuit (IC) card (102) of a first type or of a second type, the IC card having operational contacts and responding differently to signals applied to their respective operational contacts, the method comprising the steps of:

providing one reader (116) having operational contacts for receiving the IC card;

5 accepting an integrated circuit (IC) card (102) into the reader;

determining whether the integrated circuit (IC) card (102) in the reader (116) is a card of the first type or a card of the second type by subjecting the card (102) in the reader (116) to a signal and determining whether a responsive signal from the card is characteristic of a card of the first type or a card of the second type; and

10 implementing an interface for the identified IC card, characterized in that at least one signal path to predetermined ones of the operational contacts is enabled, or at least one signal path is disabled (122, 124, 126), as a result of whether the responsive signal was determined to be characteristic of the first type or the second type.

15 8. The method of claim 7 wherein the signal is selected such that a card (102) of one of said first and second types transmits a reply signal in response to the signal and a card (102) of the other of said first and second types is non-responsive to the signal.

9. The method of claim 7 wherein the signal is a reset signal.

20 10. The method of claim 7 wherein said implementing step comprises the step of disabling selected contacts of the IC card (C4, C8) if said determining step identifies the IC card as a card of one of said two types.

25 11. The method of claim 7 wherein said implementing step comprises the step of enabling selected contacts of the IC card (C4, C8) if said determining step identifies the IC card as a card of one of said two types.

12. The method of claim 7 wherein one of said types is ISO/7816.

30 13. The method of claim 7 wherein one of said types is NRSS.

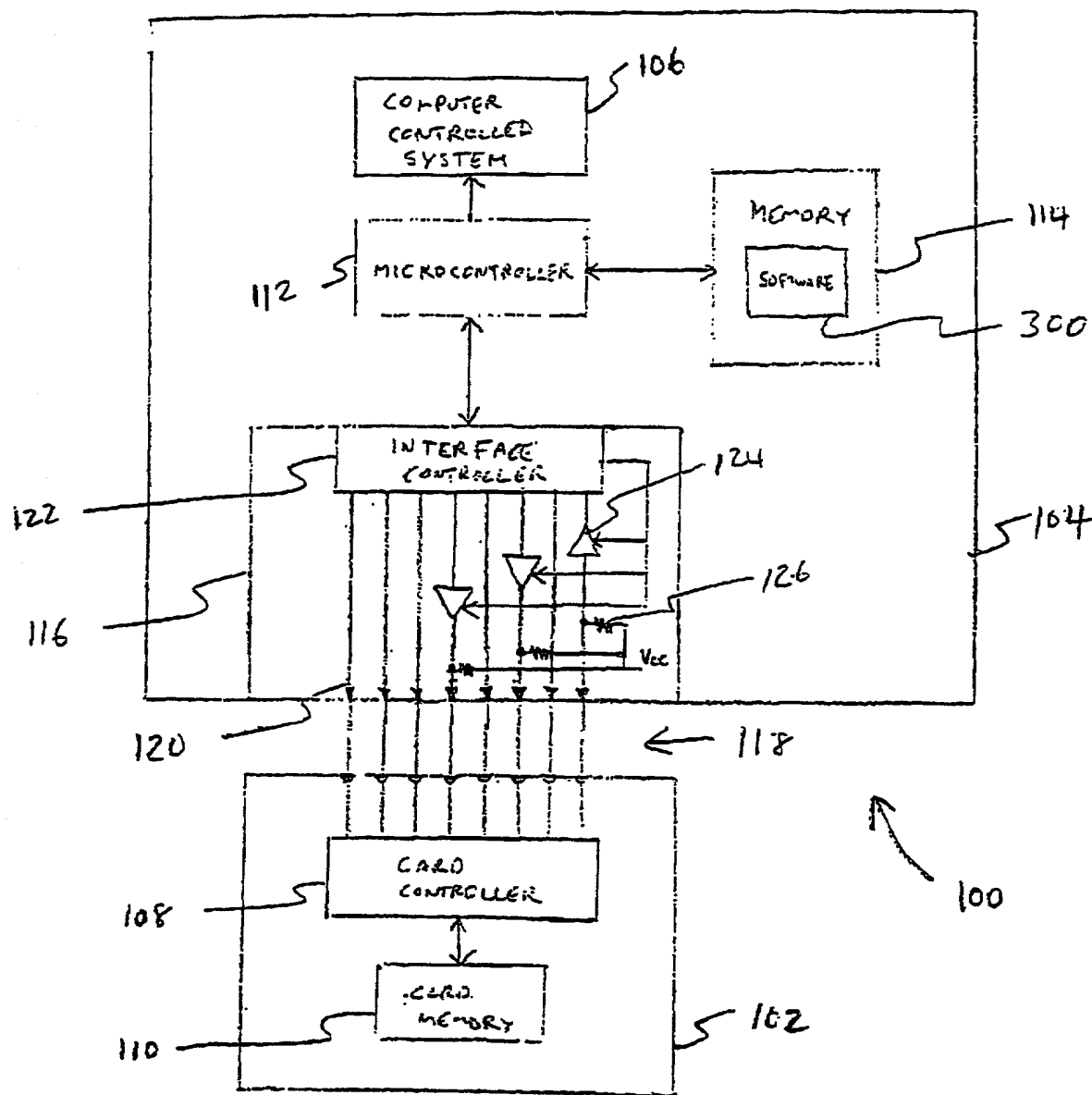


FIG. 1

Contact#	ISO/7816 Assignment	NRSS Assignment
C1	VCC (Supply Voltage)	VCC (Supply Voltage)
C2	RST (Reset Signal)	RST (Reset Signal)
C3	CLK (Clock Signal)	CLK (Clock Signal)
C4	Reserved	NRSS Data Input
C5	GND (Ground)	GND (Ground)
C6	VPP (Programming Voltage)	NRSS Clock Signal
C7	I/O (Data Input/Output)	I/O (Data Input/Output)
C8	Reserved	NRSS Data Output

FIG. 2

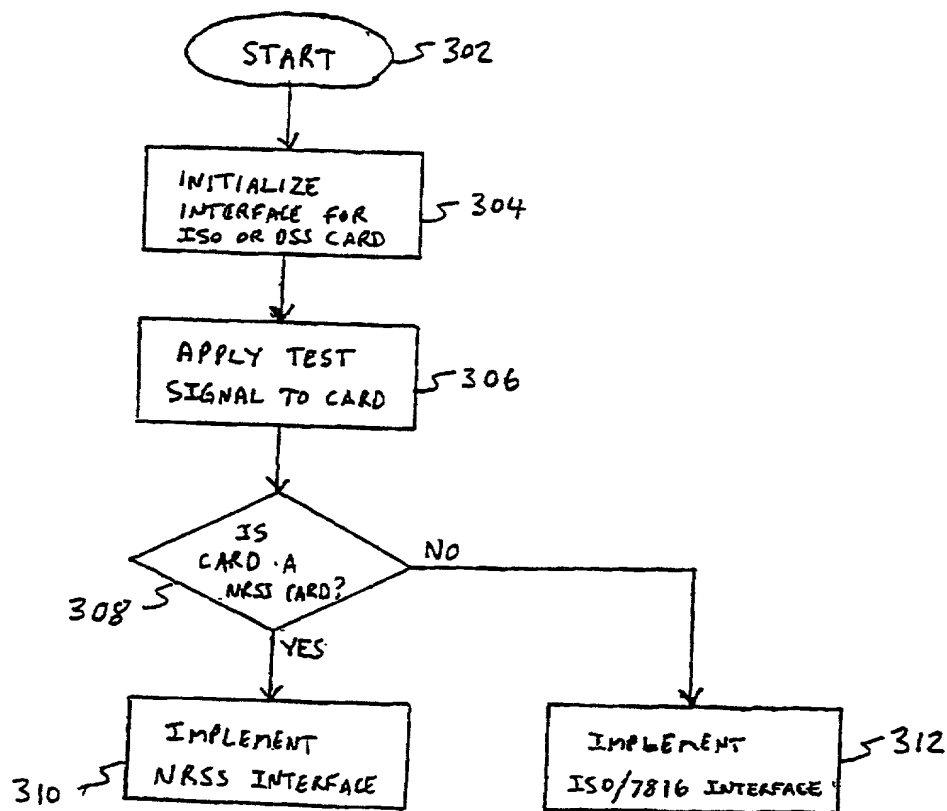


FIG. 3

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**DECLARATION FOR UTILITY OR
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PATENT APPLICATION
(37 CFR 1.63)**

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Filing

OR ☐ Declaration
Submitted after Initial
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(37 CFR 1.16 (e))
required)

Attorney Docket Number

RCA 89608

First Named Inventor

Charles William Worrell et al

COMPLETE IF KNOWN

Application Number

/

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Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD AND APPARATUS FOR SUPPORTING TWO DIFFERENT TYPES OF
INTEGRATED CIRCUIT CARDS WITH A SINGLE CONNECTOR**

the specification of which

(Title of the Invention)

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

July 12, 2000

as United States Application Number or PCT International

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PCT/US00/18893

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June 13, 2001

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY) Country	Priority Not Claimed	Certified Copy Attached?	
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			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
60/143,843	July 15, 1999	

[Page 1 of 2]

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☐ A petition has been filed for this unsigned inventor

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